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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,075	10/30/2003	Michael L. Mallary	3123-526	8116

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MARSH, FISCHMANN & BREYFOGLE LLP
3151 SOUTH VAUGHN WAY
SUITE 411
AURORA, CO 80014

EXAMINER

DAVIDSON, DAN

ART UNIT	PAPER NUMBER
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2651

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/697,075

Applicant(s)

MALLARY ET AL.

Examiner

Dan I. Davidson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-44 is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-13 and 45 is/are rejected.
- 7) ☒ Claim(s) 4-7 and 14-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10302003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The information disclosure statement filed October 30, 2003 has been received and has been considered and made of record.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 11 and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Clinton et al (US 2003/0227701 A1).

Re claims 1 and 45; Clinton et al disclose a magnetic recording device, comprising: a perpendicular write head (Fig. 2, 10; paragraph 32) comprising a write pole having a write pole tip (Fig. 2, 12) and a return pole (Fig. 2, 14); and a recording medium comprising a longitudinal magnetic recording layer (Fig. 2, 24, 30; paragraph 32) and a soft magnetic underlayer disposed under the recording layer (Fig. 2, 26; paragraph 32), wherein during operation of the magnetic recording device the longitudinal recording layer is disposed in relation to the perpendicular write head to place the magnetic recording layer within an effective write gap formed by the perpendicular write head and the underlayer (this says the same thing as element (d) of

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claim 45; see Fig. 2 & paragraph 32). It is inherent in dynamic magnetic recording that the longitudinal recording layer move relative to the write head.

Re claim 2; Clinton et al disclose that the perpendicular write head is a shielded pole write head comprising a write shield (paragraph 49 & Fig. 8).

Re claim 11; Clinton et al disclose that the soft magnetic underlayer has a thickness sufficient to prevent saturation of the underlayer by the perpendicular write head (this is shown through disclosing that the SUL "pulls" the magnetic field through the recording medium).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clinton et al (US 2003/0227701 A1) as applied to claim 1 above, and further in view of McGeehin et al (US 6,807,027 B2).

Clinton et al disclose the limitations at claim 1 as discussed above. They do not disclose that the perpendicular write head is a monopole write head. McGeehin et al teach this feature (Fig. 1, 26). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to use a monopole write head in Clinton et al in place of a shielded pole write head; motivation being reducing the size of the head.

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6. Claims 8-10 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clinton et al (US 2003/0227701 A1) as applied to claim 1 above, and further in view of Wood et al (US 5,041,922 A).

Re claim 8; Clinton et al disclose the limitations at claim 1 as discussed above. Clinton et al do not disclose that the soft magnetic underlayer comprises NiFe. Wood et al teach this limitation in the context of a recording medium having a longitudinal recording layer overlying a soft magnetic underlayer (col. 6, line 36; see also Fig. 2 for structure of the layers of the medium). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to use NiFe as the material for the soft magnetic underlayer in Clinton et al; motivation being effecting transfer of the flux between the head and the magnetic recording layer (Wood et al, col. 6, lines 27-29).

Re claim 9; Clinton et al do not disclose that the soft magnetic underlayer has a magnetic coercivity of not greater than about 5 Oersteds. Wood et al teach this limitation as well (col. 8, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to have a low coercivity soft magnetic underlayer in Clinton et al; motivation being effecting transfer of the flux between the head and the magnetic recording layer (Wood et al, col. 6, lines 27-29).

Re claim 10; Clinton et al do not disclose that the soft magnetic underlayer has a magnetic permeability of at least about 50. Wood et al teach this limitation (col. 8, line 68 – col. 9, line 2). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to have a high permeability soft magnetic underlayer in

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Clinton et al; motivation being effecting transfer of the flux between the head and the magnetic recording layer (Wood et al, col. 6, lines 27-29).

Re claims 12-13; Clinton et al do not disclose that the soft magnetic underlayer has a thickness of at least about 30 nm. Wood et al teach this limitation (col. 8, lines 61-62). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to have a soft magnetic underlayer with a thickness of from about and at least 30 nm to 200 nm in Clinton et al; motivation being effecting transfer of the flux between the head and the magnetic recording layer (Wood et al, col. 6, lines 27-29).

Allowable Subject Matter

7. Claims 19-44 are allowed over the prior art of record.

Re claim 19; the prior art of record fails to teach the combination of a shielded pole write head, a non-magnetic spacer layer and a longitudinal magnetic recording layer.

Re claim 35; the prior art of record fails to teach or suggest that the longitudinal recording layer disposed over the non-magnetic spacer layer has a coercivity of at least about 4000 Oe.

8. Claims 4-6 and 14-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re claim 4; the prior art of record, and in particular Clinton et al (US 2003/0227701 A1), fails to teach or suggest within the context of claim 1 that the

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recording medium further comprises a non-magnetic spacer layer disposed between the longitudinal magnetic recording layer and the soft magnetic underlayer.

Re claim 14; the prior art of record, and in particular Clinton et al (US 2003/0227701 A1), fails to teach or suggest that the longitudinal magnetic recording layer has a coercivity of at least about 4000 Oe.

Re claim 15; the prior art of record, and in particular Clinton et al (US 2003/0227701 A1), fails to teach or suggest that the distance from the top of the soft magnetic underlayer to the write pole tip is about equal to the distance from the write pole tip to the write shield.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ikeda (US 2001/0019786 A1) teaches a perpendicular magnetic recording medium having at least one magnetic recording layer overlying at least one soft magnetic layer, the soft magnetic layer being divided into a plurality of layers by separate, non-magnetic layers.

Akimoto et al (US 6,541,104 B2) teach a magnetic recording medium having an intermediate, non-magnetic spacer layer overlaying a soft magnetic underlayer and underlaying a recording layer.

Gooch et al (US 5,830,590 A) teach a magnetic recording medium having a low permeability keeper layer (i.e. soft magnetic layer) deposited above a magnetic recording layer.

Richter et al (US 6,495,252 B1) teach a high bit density recording medium having an exchange de-coupling layer positioned between a soft, superparamagnetic underlayer and a magnetic layer.

10. The following is not prior art but is included since it is relevant to applicant's disclosure.

Hsiao et al (US 2005/0190478 A1) teach using a perpendicular head with a longitudinal recording medium, the medium having a magnetically soft underlayer overlayed by a spacer layer.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan I. Davidson whose telephone number is (571) 272-7552. The examiner can normally be reached on Monday-Friday from 8:30AM to 5:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth, can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Dan I Davidson
September 9, 2005


**DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600**